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Letter to the Editor

Reassessing the "real scenario" regarding the environmental sustainability of palm oil

In a recent account of palm oil sustainability in *Renewable and Sustainable Energy Reviews*, Tan et al. [1] examine environmental impacts and conclude that the negative issues reported in the literature were "misleading and confusing the public perception". While their review of potential benefits of industry-led certification is informative, the validity and objectivity of their account of environmental issues is highly questionable. At best, their appraisal is unbalanced and misleading. At worse, it is an insidious promotional tool for the Malaysian Palm Oil Council, an organisation well known for its use of aggressive public relation campaigns to dismiss the valid concerns of environmentalists and conservation scientists [2].

Tan et al. selectively report the peer-reviewed literature regarding oil palm mediated deforestation, biodiversity losses and carbon emissions, and paint the inaccurate picture that these are merely unsubstantiated NGO claims, when in fact they are concerns shared by the scientific community and are founded on empirical data. Re-examination of the land-cover data that Tan et al. cite in their paper reveals that between 1990 and 2005, at least 55% of oil palm expansion in Malaysia, and at least 56% of that in Indonesia occurred at the expense of rainforest [3]. Nevertheless, it is the author's distortion of the "real scenario" regarding biodiversity impacts that is particularly compelling. Their claims that "oil palm plantation is able to maintain biodiversity and preserve the flora and fauna" (sic) and "reduced biodiversity and ecology instability of flora and fauna is not an issue..." are simply unfounded, and ignore numerous studies available at the time of writing that demonstrate severe biodiversity losses in oil palm plantations (e.g. [4–6]). To substantiate their argument, the authors cite a wildlife dataset from plantations in Sabah, Malaysia, yet these data demonstrate the relatively low levels of biodiversity in plantations [3]! Indeed, the "real scenario" regarding oil palm biodiversity is that plantations are a lot closer to the biological deserts observed in other intensively managed agricultural systems [4]. On average across studies, oil palm plantations support around 15% of the species found in undisturbed forest and usually far fewer species than disturbed forests or alternative crops [7,8].

A further criticism of the review is that the authors make a crude argument that oil palms sequester carbon better than rainforest with no discussion of the validity, assumptions or implications of their source data. Whether palms sequester carbon faster or not is in fact of little relevance, because the fundamental issue is that residual carbon stocks are disturbed when a plantation is planted in the first place. A long carbon payback time, in the order of centuries, is therefore initiated by replacing carbon-rich lands, such as forests and peatlands, with biofuel plantation [8–10]. Even if plantations replace grasslands, it will take decades for the carbon released through clearance to be compensated for by the carbon savings promised by palm-derived biofuel. This form of biofuel will therefore be a larger net-source of carbon emissions than conventional fossil fuels in the foreseeable future, because plantation cycles are normally 25 years, and carbon payback times typically exceed this timeframe.

Issues surrounding the environmental impacts of biofuels have attracted considerable attention in the literature, and those published in journals such as *Renewable and Sustainable Energy Reviews* receive a wide readership and can inform future policy. It is therefore of serious concern if reviews do not sufficiently embody their subject area, particularly if they are unbalanced and appear to promote vested interests. Unfortunately, this situation points to a wider problem in the sustainability literature whereby often parallel and quite related disciplines are communicated to separate audiences. Regarding biofuels, conservation scientists inform other conservationists about the negative impacts of oil palm. Meanwhile, those in the renewable energy and political arena are busy maintaining its sustainability credentials!

Oil palm does indeed perform better than some other agricultural commodities in terms of environmental sustainability, but there remain serious negative impacts that need to be addressed [7,8,10,11]. The bulk of the scientific literature describing these impacts was available at the time that Tan et al. wrote their article, and so the authors could have produced a much more balanced authoritative review. It is not too surprising that those in disciplines such as renewable energy might have different views on sustainability to those in other fields such as land-use change and biodiversity conservation. It is also reasonable that either discipline may not necessarily have the expertise to fully appreciate the details of the other. Nevertheless, reviews should remain informative, balanced, and neutral. This therefore underscores the need for increased dialogue and collaboration between our environmental disciplines if we are to improve our understanding of sustainability issues and create meaningful policies to address them.

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